

Using Oracle to Track a Course Given on the World Wide Web

Rodney B. Murray, Ph.D., Insoo Kang, M.S.E., Anthony Frisby, Ph.D.,
Elizabeth R. Warner, M.S.L.S., Michael Hamlin, Ph.D.
Thomas Jefferson University, Philadelphia, PA

The Internet, especially the World Wide Web (WWW), has grown at an exponential rate thanks to the introduction of graphical browsers such as Mosaic and Netscape. Most educational institutions with a link to the Internet have been quick to develop campus-wide and departmental information systems, and even on-line educational materials using the multimedia capabilities of the WWW and associated browsers. Here, we discuss our efforts at coupling interactive on-line course material developed in Hypertext Markup Language (HTML) for the WWW to a relational database management system (RDBMS), Oracle.

Although the WWW has brought distributed hypertext and hypermedia to the Internet and made it easy to use, there is a deficit when it comes to managing the huge amount of data that this technology engenders. Since we already had experience using Oracle to manage large data sets, we developed a method to interface data collection from on-line HTML forms to our Oracle system.

The method described here was applied to a new computer-based course in clinical genetics. The course was designed for the Jefferson Medical College second year class, for use during a four week January 1995 semester called the Jan-Plan. The goals of the course were: to simulate the clinical decision making process in genetics, to provide structured interaction between experienced clinical faculty and beginning students of genetics, and to familiarize students with key information tools and techniques. Each member of the class of 225 students was required to complete two of three computer-based clinical cases. This was accomplished by the students working at their own speed at computer workstations -- Power Macintosh 7100s running Netscape attached by Ethernet to an IBM RS/6000 server.

The computer-based clinical cases were written in HTML and included links to knowledge resources at Jefferson and on the Internet. Integrated throughout the cases, were numerous free entry text fields where students were to answer questions or "paste" results

from searching various on-line knowledge bases.

A program on the server provided a gateway to enable data from the Netscape client to be entered into an Oracle database. This was carried out in a two step process. First, a CGI-compliant program, written in C, organized and saved relevant data to a file. Then, a PRO*C (a C language that allows embedded SQL statements) program read the file, parsed the data into a format readable by Oracle, and submitted it to the Oracle database.

To allow the instructors to easily analyze the data, we developed two additional modules, the Jan-Plan Report Generator and the Jan-Plan Browser. These were designed and programmed in Oracle Card and the Oracle Talk scripting language. The Jan-Plan Browser offers a quick sampling of the data, while the Report Writer gives a complete and customizable analysis of the data.

The above method describes our original method for submitting data from the WWW client to an Oracle database. Since the course, we have adapted Oracle's WWW Interface Kit, called WOW (Web-Oracle-Web), for future on-line courses. WOW is a utility that allows one to develop CGI gateways using PL/SQL code in an Oracle7 database. Using the PL/SQL WOW package, we have developed several CGI gateways that can generate HTML forms "on-the-fly." These gateways are executed as a package of stored procedures within Oracle. Since these procedures are executed within an Oracle database, they automatically inherit the characteristics of the Oracle7 database, including: scalability, portability, replication, distribution and object encapsulation.

In conclusion, the methods outlined here promise to ease the transition from stand alone WWW-based educational modules to ones that can be organized and tracked, to assure the quality and consistency of our educational efforts. Also, bringing the power of a RDBMS, such as Oracle, to the WWW allows us to easily migrate the system to larger and faster servers, as demand grows.